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ORIGINAL ARTICLES.

WHEN WE SHOULD NOT PRESCRIBE GLASSES.

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In a general way glasses should not be prescribed when the benefit to the patient will not compensate for the expense entailed, and the inconvenience and annoyance of wearing them.

1. *When there is no ametropia or strain of the eyes,* connected with the focussing, or with adjusting them for binocular vision, the reason for not prescribing glasses is perfectly obvious. Lenses and prisms simply change the direction of rays of light; colored glasses change the color or diminish the brightness of light. When such modifications of light entering the eye will not be distinctly beneficial, they should not be made.

2. *When ametropia is present, but does not limit the power of vision, or cause discomfort, or harm of any kind, lenses are unnecessary.* We do not need to prescribe spectacles merely because one or both of the patient's eyes depart perceptibly from the emmetropic standard. We describe them because such departure places the patient at a disadvantage; by diminishing his acuteness of vision, or by entailing such increased effort to secure distinct vision that the ocular or general health suffers perceptibly by reason of it.

Patients with low myopia, who have passed the age when myopia tends to increase, and who are not inconvenienced in

any way by the slight indistinctness of distant vision that it causes, may do just as well without glasses. Patients with low hyperopia or low astigmia, who do not require of their eyes much accurate near seeing, may be as well off in every way without correcting lenses. We do not prescribe lenses simply to make up for the deviation of the eye from a certain mathematical standard, but rather to relieve symptoms or prevent damage from strain.

When this is more generally understood, there will be less delay in seeking to relieve symptoms by glasses than there now is under the impression that glasses are prescribed for ametropia *per se*. Ametropia is something that the general practitioner does not know to exist in the particular case, therefore he feels that he can, for the time, leave it out of consideration, and try in other directions to give relief. If it be remembered that the glasses are not for the ametropia, but are to relieve the headache, nausea, vertigo, or nervousness, which the case unmistakably presents, a more reasonable attitude will be assumed in regard to them.

In the same way patients are not given lenses because they have reached the age of presbyopia, or because their accommodation has fallen to a certain level. They need the lenses when the accommodation becomes insufficient; taking into account the habits, requirements, and conditions of work of the particular patient.

As a division of this branch of the subject should be mentioned the discontinuance of spectacles when no longer required. It may be of the utmost importance to the myope, prior to the age of 20 or 25, to wear constantly the correcting lenses for low myopia. But after the period has passed during which myopia is likely to increase, it may be perfectly safe to go without the correcting lenses; and the wearing of them can be left to the preference of the patient. In the same way, many school children suffer from strain of the eyes associated with low hyperopia, with or without astigmia. And these children are greatly benefitted by wearing, for a time, their correcting lenses. But when they are no longer subjected to the strain of school work, perhaps taking up occupations that require little or no use of the eyes at short distances, and especially after they have learned to use their eyes to good advantage, holding the object to be seen well away from them, they may get along just as well without the correction for

their ametropia, although the ametropia remains as great as ever. There are also cases in which ametropia diminishes, and the use of glasses is to be discontinued on that account.

There are many patients who suffer from eye-strain because of depressed general health, as after acute specific fevers like measles, typhoid or influenza; or, from chronic malnutrition, who can be benefitted by spectacles, but they would be still more benefitted by restoration to the normal plane of general health. In Colorado the patients suffering from the toxins of the tubercle bacillus constitute an important part of this class.

3. *If the symptoms present, although such as are likely to arise from ametropia, are probably due to other causes,* glasses are not to be resorted to until other therapeutic measures have been tried. Here we might enter upon a wide range of minute differential diagnosis. But I shall only consider a few more important points.

The headache of eye-strain, in its location, recurrences, exacerbations, and many of its associations, does not differ from headaches due to other causes. It is by the exclusion of other causes, through the general processes of differential diagnosis that eye-strain headache is to be recognized, before applying the therapeutic test. Neglect of careful differential diagnosis leads to frequent errors. All engaged in ophthalmic practice have encountered cases of organic disease of the brain, of uremia, and of other chronic intoxications, in which relief was being sought by the wearing of glasses.

If routine trial of one treatment for every case presenting a certain symptom were ever justified, it might be the trial of glasses for headache. But such routine is not justifiable. Here, as elsewhere, all possible causes of headache should be passed in review, and their probable share in the particular case estimated, before deciding on a line of treatment. In general, eye headaches are chronic, either constant or having recurred at intervals for a considerable period. An acute first attack of headache, arising from eye strain will be pretty clearly connected with some particular hard use or abuse of the eyes. If there is no history of such especial strain of the eyes, other lines of treatment than the prescription of glasses should first be tried for acute headache.

Among headaches likely to be suspected of ocular origin are those due to disease of the accessory sinuses of the nose, the maxillary antrum, frontal, ethmoidal, and even sphenoidal sinuses.

These headaches are often chronic, sometimes experienced every day for months, and they are referred to the immediate region of the eyes. The difficulty with regard to them is that the usual symptoms of sinus disease may be quite absent; skilled rhinologists finding no evidence of such conditions. But careful search will often reveal the history of nasal disease, or of periods of relief preceded by a discharge from the nose. In frontal sinus disease there is very generally tenderness on firm, deep pressure at the upper inner angle of the orbit, in the region of the pulley of the superior oblique muscle. This symptom is sometimes misinterpreted as pointing to an ocular origin of the headache, when it really indicates sinus involvement. All the symptoms of nasal or sinus disease should be carefully sought for, and weighed against the presence of ametropia, and the history with regard to the use of the eyes should be carefully considered before prescribing spectacles for headache.

Vertigo, although frequently encountered in cases of eye strain, is rarely an important indication for the prescription of spectacles. I have seen patients wearing glasses for well-marked Menière's disease. Old people suffering from vertigo due to vascular disease, frequently seek relief through glasses. It is scarcely necessary to say that for these troubles glasses should not be prescribed. Vertiginous disturbances almost invariably mark the onset and early course of paralysis or paresis of the extra-ocular muscles. At a later period prisms may be of benefit in these cases. But at this early stage the weakness of the affected muscle or muscles varies from day to day, and prisms are of very little use. The symptom is rather to be palliated by exclusion of one eye from vision. If the patient wears glasses this may be accomplished by pasting a piece of tissue paper on the back of one of his lenses.

In Sydenham's chorea, epilepsy, and some forms of insanity, spectacles may be resorted to as a means of removing one cause of nerve strain; where, so far as possible, all such causes should be removed. But the evidence of eye-strain should be found outside of the mere existence of the chorea, epilepsy, or insanity; as the presence of high ametropia, or the connection of eye work with choreic movements, epileptiform seizures, or mental disturbance. In "habit chorea" eye-strain is more likely to play an important part.

For anorexia, nausea, and indigestion it is scarcely needful to warn against the prescription of glasses. The predilection of

both patient and general practitioner is usually to try all other sorts of treatment, for prolonged periods, before thinking of any connection of the symptoms with eye-strain. Eye-strain will not and should not, lightly or hastily be assumed as the cause of these symptoms, although its possible causative relation to them should never be forgotten.

4. *In the cases of eye-strain connected with imbalance of the ocular muscles, it is too frequently expected that spectacles will give relief.* Sometimes they do; sometimes they are a necessary adjuvant to other treatment. But in a large proportion of cases the basic fault is not in the eyes or ocular muscles. But rather in the central nervous system, the general nutrition of the patient, or his habits of life. While in such cases the prescribing of glasses might be of benefit, the correction so far as possible of the underlying causes, will be of more permanent and general benefit.

5. *Spectacles should not be prescribed without an accurate knowledge of the error of refraction to be corrected.* On the average, the patients that come to me for relief of eye-strain give a history of at least two or three pairs of unsatisfactory glasses, tried for periods varying from a few weeks to many years. Of all the reckless prescribing done by the medical profession, the prescribing of spectacles without accurate measurement of the defect they are supposed to correct, takes the lead. It is only surpassed by the recklessness of the opticians, who get paid for the time they spend upon a customer only by selling him a pair of glasses. Their own suspicion of the inexactness and uncertainty of their recommendations is reflected in their common willingness to "change the glasses without farther charge", knowing that each change of glass gives one more chance to come nearer to the proper correction.

The prescription of the wrong glasses of course tends to bring all use of glasses into disrepute. The patient says, "I have tried glasses for my headache, a half dozen different pairs, and they do not relieve it." He does not realize that of the ten thousand combinations that might be made from the trial case, 9,990 would not give any relief. And probably his half-dozen pairs have been chosen from the 90 that would approximate a true correction, but outside the few that would really be of marked benefit.

The medical profession does a good deal of inexact, hit-or-miss, hope-it-will-do-no-harm prescribing. The human system will take drugs poured into it and dispose of them in some way, usually without serious ill-effects; and these ill-effects are over-

come in a comparatively short time, and cannot often be recognized as clearly due to the drugs. But a pair of spectacles placed upon a patient's face, continues so long as they are worn, an outward and visible reminder of failure to give relief. For each eye there are comparatively few combinations that would be of positive benefit, and but one that would be best. That one is to be discovered only by prolonged, painstaking application of exact methods of measurement. To prescribe glasses without the careful application of such methods is peculiarly reckless and disastrous to both patient and prescriber. The reputation of individual prescribers, and of the profession at large are sure to suffer from it.

6. *Colored glasses.* No discussion of this subject would be complete without a word on the prescribing of dark glasses. Hypersensitiveness to light is a symptom of most ocular inflammations. But it is an indication for rest of the eye; not for its use by diminished illumination, that will make seeing more difficult. In a large majority of cases the wearing of dark glasses, while temporarily pleasant, does not in the end diminish the patient's suffering from exposure to light. It has a very similar effect to excessive clothing, or continual guarding against drafts, in increasing the liability to colds, but even more important. The nutrition of the eye and especially the choroid, the nutritive coat of the eye, is peculiarly dependent on the stimulation of light.

Just as the calluses developed in the skin by pressure and friction are the best defense against the effects of pressure and friction thereafter; just as the changes produced in the skin by exposure to sun-light are the best preventive of subsequent solar dermatitis; so the regular exposure of the eyes to light is the preventive and physiologic remedy for photophobia. Indoor living develops great numbers of cases of photophobia, for which exposure to outdoor light is the important or only effective remedy. For such cases dark glasses are only a doubtful or even dangerous palliative, that might be compared with dependence on opium for appendicitis.

Dark glasses can be used temporarily to diminish the effects of extreme light; as when the pupils are dilated by a mydriatic or on going out in bright sun-light shining on the snow, or reflected from water. But they should never be worn constantly; and where the temporary exposure to excessive light does not occur, or where it can be met by partly shading the eyes until they become accustomed to it, dark glasses should not be prescribed at all.

ENUCLEATION OR EVISCERATION?*

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A few weeks ago, a little girl was brought to me, with a piece of copper in the vitreous of the right eye. The X-ray demonstrated beyond question the presence of the body and located it where its removal was an impossibility. The danger of sympathetic ophthalmia rendered an operation imperative. The thought of an enucleation with its consequent deformity was most repugnant. The only alternative was an evisceration, which at best offered only a slightly improved cosmetic effect. When the child was under the influence of ether, before resorting to the more radical operation, I attempted to extract the foreign body, but without success. This attempt left a collapsed globe. A collapsed globe is a source of embarrassment in the operation of enucleation, but in no way increases the difficulties of an evisceration. In spite of the fact that evisceration promised the better stump and much the simpler operation I enucleated. I enucleated, because there was in my mind a more or less well defined impression that the weight of authorities would be found on the side of this operation, as affording the greater security against the development of sympathetic inflammation in the other eye. Since this operation I have had misgivings. If an evisceration would would have been a simpler operation and given a better stump for an artificial eye, was there sufficient reason for rejecting it in favor of an enucleation? I wish to present the following propositions for your discussion, hoping from your experience to establish a definite policy for my guidance when similar conditions again arise.

First. From the standpoint of manual manipulation, which is the simpler operation, enucleation or evisceration?

Second. Which results in the better stump? In deciding this question, we must consider which operation leaves the conjunctival mucous membrane in the healthier condition, which results in the least sinking in of the orbit and which gives the greatest movement to the prothesis.

Third. Which best safeguards against sympathetic ophthalmia?

*Read at the December meeting of the St. Louis Ophthalmological Society.

Fourth. Which is safer as regards other sequelæ, such as infection of the orbital tissues, sinus thrombosis and meningitis?

To revert to the first question—which is the simpler operation? Every one has his own way of doing an enucleation and I doubt not, most operators think their way the best. However, most methods follow, more or less closely, the procedures of Bonnet, O'Ferral, or Arlt, and these are too well known to elaborate here. Though an enucleation is certainly not a very difficult operation, yet I am not inclined to view it superciliously.

To remove the least possible amount of conjunctiva; to separate all the extra-ocular muscles cleanly from the sclera and lastly to cut the optic nerve, without hashing the orbital tissues, requires a certain skill, derived usually from experience. If it is necessary to enucleate a collapsed globe, a neat result will depend upon a bit of tedious painstaking.

"In purulent inflammations of the eye, panophthalmitis, there is sometimes so much thrombosis in the orbital veins that the orbital tissue is altogether hard and lardaceous, and the eyeball has to be carved out of a stiff socket. If we take our time and have the sclerotic always before us, the operation can be correctly performed and the recovery is mostly undisturbed." (Knapp.)

Brudenell Carter says: "When the eyeball has been ruptured, and its coats are empty and flaccid, the operator must dissect out the sclerotic as carefully as he can, using the hook and scissors for the muscles, and drawing the remains forward with forceps in order to divide the nerve. The proceeding is often difficult, especially if the conjunctiva and orbital tissues are inflamed, infiltrated with blood, or swollen; but by perseverance it will generally be possible to remove everything, and to leave conditions favorable for healing."

By the free use of cocaine an eye *may* be enucleated without general anæsthesia. Ellis and Longworthy, (*Arch. of Oph.*, Jan., 1907) claim it is very nearly painless. I have never yet heard of a surgeon who has had it performed upon himself and believe Stutzer is quite correct when he says "even a strong man may suffer severe and prolonged shock from an enucleation under local anæsthesia." In my first enucleation, when attempting to divide the optic nerve, I emptied the ball by cutting through the sclera. I have no very distinct recollection of what occurred thereafter, but I have ever since entertained for this simple surgical procedure an unwarranted degree of respect. Arlt's

operation I should think impossible in case of a collapsed globe. I am a bit surprised to find so many authors declare that an evisceration is a more difficult operation than an enucleation. The explanation is found in their descriptions of an evisceration which is always made more formidable than is necessary. For example, the following is Knapp's description of the operation in Norris and Oliver's system: "The lids being separated with a speculum, the operator steadies the eyeball with fixing forceps implanted near the lateral corneal limbus; an assistant may do the same five millimetres backward. The operator incises the sclerotic between the two pairs of forceps, near the one implanted in the sclero-corneal border, with a scalpel, cautiously, by successive strokes until the pigmented ciliary body is laid bare. One branch of strong scissors with slender and blunt pointed tips (Steven's) is introduced through the opening and slowly pushed through the suprachoroidal space, the point sliding against the sclerotic, not against the ciliary body, for three or four millimetres parallel with the corneal margin, when the sclerotic comprehended between the branches of the scissors is cut. The lips of the end of the wound are now separated by the two pairs of forceps as before, the inner branch of the scissors advanced farther and the sclerotic cut. The manoeuver is repeated until one-half of the sclerotic is incised. The other half is divided in the same way, beginning at the temporal side, and going around until the two incisions meet. The wound is kept open with two pairs of forceps at the upper edge about ten millimetres apart, and a flat, sharp, broad spoon is pushed between choroid and sclerotic, always resting on the latter, carried sideways and deeper to detach the whole contents of the eye from the sclerotic, if possible unbroken. The vorticose veins and the optic nerve offer the greatest resistance, and must be served with particular care. The inner side of the sclerotic is inspected, and if any particles of tissue are left they must be cleanly removed with a sharp spoon or a curved chisel, and in some cases, moreover, with sterilized gauze. The cavity is then irrigated with a mild antiseptic and allowed to fill with blood, if there is sufficient flow. The wound is closed with four or five sutures passing through the conjunctiva and the edges of the sclerotic. The circular form of the wound becomes linear, with projecting corners, unless we remove small triangular pieces at the ends, as in the amputation of corneal staphyloma, which is advisable."

Instead of the spoon, Beard uses his exenteration knife-spatula for separating the contents of the eye from the sclera. He closes his description as follows: "The perfect safety attending the modern exenteration, wherein the conjunctiva and Tenon's capsule are left intact, and the outer walls of the globe, including the cornea, are entirely preserved; the slight reaction following, and the large movable stump thus afforded, are causing the procedure more and more to supersede that of enucleation—and justly."

De Schweinitz does not lay any stress upon the careful removal of contents in one piece, but says, "With the evisceration scoop the contents of the globe are thoroughly evacuated." He then advises closing the wound with a tobacco pouch suture in the conjunctiva alone unless this is much macerated, when it may be necessary to include the sclera. Swanzy lays emphasis on removing the choroid unbroken. He also stitches the "scleroticoconjunctival" wound.

Berry says the conjunctiva should be stitched and drawn together, but the sclera should not be stitched.

Gifford after giving the usual description says, "For the comfort of the patient strictly simple evisceration—i. e., without excising the cornea—is much superior. This is done by making an incision clear across the cornea, extending for a short distance into the sclera on either side, utilizing any extensive corneal wound which may be present. Through this the entire contents of the globe are scraped out with an evisceration spoon." Gifford claims the cornea becomes entirely insensitive in time.

The above constitute about all the variations in the operation, which I have been able to find. Leaving the cornea seems to me ill advised owing to its profuse nerve supply and its tendency to considerable shrinkage in course of time. The operation as I perform it is as follows: The cornea is cut off at the scleral junction with a knife or curved scissors. The contents of the globe are then scraped out with a Bunge evisceration spoon or with an ordinary surgical curette. There is considerable hæmmorrhage but not enough to interfere with the through curetting of the cavity. Bleeding is stopped by pressure with a cotton sponge. The inside of the sclera is then cauterized white with pure carbolic acid on a cotton applicator as recommended by Prince, and pressure bandage applied. The whole process is elemental in its simplicity. The contention of

most authorities is that the pain and reaction following an evisceration is very much greater than following an enucleation. This has not been my experience. The subsequent pain in either operation is negligible. The amount of swelling may be some greater following an evisceration, but this is probably due to the fact that there is more left to swell. I have never seen sub-cutaneous ecchymosis, so common after enucleations, to follow an evisceration. After all, if there is anything whatever of a permanent nature to be gained by an evisceration no consideration should be paid to a few hours more discomfort to the patient or a few millimeters more swelling of the orbit. Why these two insignificant factors should be dwelt upon with such universal persistency in weighing the advantage of these operations, I cannot explain. I have performed one evisceration under local anæsthesia. The case was one of panophthalmitis in which the pus in the ball had become organized into a cheesy mass. The cornea was abscised, the contents removed and sclera cauterized under repeated drops of cocaine, without any complaint from the patient. Assuming that we have an eye ball that has not been punctured and that has approximately normal surrounding tissues, or in other words a condition which would render enucleation easiest, I still think evisceration the simpler operation. If the eyeball is collapsed, evisceration is much the simpler, and if panophthalmitic, evisceration is infinitely the simpler operation from the standpoint of manual manipulation. I have intentionally excluded consideration of the Mule operation and its modifications.

The second question is, which operation results in the better stump? In an evisceration the bulbar conjunctiva is not disturbed. Its relations to the underlying tissues remain normal. As a consequence I think we are justified in believing it functions more normally than it does when torn from the sclera and attached to a new tissue. In two instances, after enucleation, I have had a dropsical, œdematous protrusion of the lower part of the conjunctiva of the orbit, which has embarrassed the proper adjustment of a glass eye. This œdema is probably due to some fault of circulation. I have never seen it after an evisceration. That an evisceration results in less sinking of the orbit and greater movement of the prothesis is contended by many. In my own experience I can say without hesitation, that the evisceration operation shows a fuller and more movable stump than after enucleation. I believe, however, that this superiority would

diminish with time. As I have not yet been able to compare any cases which have existed for a period of years. I am not in a position to assert from my own experience that the ultimate result is better after evisceration. Hotz, in '93, claimed that the eviscerated stump gave no greater movement to an artificial eye than follows enucleation. We must remember that the shell was used then and that a different conclusion might follow the use of Mueller's reform eyes in these same sockets. Even if we admit that in years the eviscerated stump is no better than the enucleated stump; still the advantage is in favor of evisceration as it is at first that the empty socket is the source of greatest humiliation to the patient. In five years one can reconcile himself to most anything. The disfigurement remaining after the the adjustment of a glass eye is due to the shrunken orbit and the immobile prothesis, therefore any method which overcomes these two defects in the slightest degree, even for a short time, will contribute largely to the happiness of the patient. We have all seen those who would undergo any operation and subject themselves to any inconvenience or expense, in order to improve the cosmetic effect of a glass eye. And yet, the standing objection against evisceration as copied, one text book from another, is that the reaction and pain are greater than in an enucleation. In a case of severe laceration of a hand the surgeon saves as many fingers and as much of each finger as possible. Amputation at the wrist would result in a pleasanter and speedier recovery. To let any such considerations enter into the conduct of the case would be considered nothing short of criminal. Why, then, should we allow the question of a little more pain and a little more swelling, all things else being equal, to deprive a patient of a fuller orbit and more movable prothesis. I cannot resist transcribing here the arguments against evisceration offered by one of the ablest of American ophthalmologists. "The greatest objections to evisceration are, first, that the stump for prothesis is soon not much larger than after enucleation; and secondly, that enucleation is easier to perform and more readily recovered from than evisceration. Yet the stump after evisceration *is* larger for there is more substance, the whole sclerotic, in it, and the recovery, even if more protracted, is not very long, and seems to be about as safe." This remarkable sentence when reduced to its lowest terms says that an evisceration is as good, or better than, an enucleation except

that the former is harder to perform. This, of course, depends upon how you do it.

The third question is, which operation best safeguards against sympathetic ophthalmia. It seems impossible to approach this question without opening the whole vexed subject of sympathetic ophthalmia. This would be a greater affliction than you could possible have anticipated, and I will promise to make every effort to spare you. However, in order to freshen our memories I will diverge from the main subject long enough to give a brief chronological résumé of the theories which have been advanced in explanation of this still obscure subject. It is assumed that the uveitis in the exciting eye furnishes a product (we know not what) which establishes a similar diseased process in the sympathizing eye (we know not how). First came the theory of Mackenzie that the inflammation of the retina was propagated along the optic nerves to the retina of the sympathizing eye. Next came Tavignol and Heinrich Mueller, who found the ciliary nerves to be the channels of communication. Gifford says, "To Alt belongs the credit of the first pathological evidence in favor of the transmission of sympathetic ophthalmia through the optic nerves." I believe this work was done by Dr. Alt as early as 1876. Then Horner and Knies with a revival of the optic nerve theory of Mackenzie in 1879. Followed in 1881 by Snellen, Berlin and Leber who maintained that the inflammation was parasitic in origin. Snellen held that the disease was transmitted from one choroid to the other through the lymph spaces of the optic nerves. Berlin thought the medium of communication to be the general circulation, and Leber contended for the optic nerve route. Next in the procession is Deutschmann with his experiments which proved to the satisfaction of many that the disease is due to the transmission of bacteria along the optic nerves and their sheaths. In 1884 Dr. Alt's experiments lead him to a conclusion similar to Deutschmann, and it was at this time, before Gifford, Bellarminoff, Selenkowsky and Rosenmeyer came forward with their toxin theories, that "Alt gave the first experimental proof that a soluble organic poison (abrus precatorius) when injected into a rabbit's eye could travel, by way of the optic nerves and their sheaths to the other eye and there produce the initial symptoms of sympathetic ophthalmia." Gifford in 1886 inclined to the belief that the disease was infectious. He thinks the path of communication "leaves the first optic nerve with the vessels, passes

through the orbit into the cranial cavity and thence via the subvaginal to the supra-choroidal space of the second eye." At the Heidelberg Congress of 1891 Schmidt-Rimpler proposed a modified ciliary nerve theory. This conception which I believe was also held by Panas and Bach, is that irritation of the ciliary nerves renders the second eye more susceptible to the influence of poisonous elements which are introduced through some other channel. Then Mazza, Randolph, Limbourg and Levy, Schirmer, Greeff, Ulrich and Bach, failed to confirm by experimentation the Deutschmann theory.

Next we have the toxin theories of Bellarminoff, Selenkowsky and Zur Nedden, and the cytotoxin suggestion of Brown Pusey in 1903. In 1904, Theobald restated his belief in the ciliary nerve theory. In 1905, Motais contends for the venous channels as the source of communication. In the same year, Raehlmann suggests the infecting element to be an ultra-microscopic body. Ruge teaches the disease in the primary eye is a fibrinoplastic uveitis and Fuchs claims it to be a proliferative uveitis (a proliferation of epitheloid cells in clusters or singly within the confines of the uvea). Fuchs is seconded by E. V. L. Brown. In 1906, Golovine holds to the Brown Pusey cytotoxin theory, Fuchs inclined to metastasis as the means of communication and Roemer suggests an invisible micro-organism, which passes through the blood, is pathogenic for the eye and indifferent for the rest of the body. Roemer also declares a disposition to the development of sympathetic ophthalmia cannot be brought about by irritation of the ciliary nerves of the first eye. All of which goes to show that we do not know what causes sympathetic ophthalmia or how the unknown cause is conveyed from the exciting to the sympathizing eye. Whether the ætiological element be a microbe, a toxin, a cytotoxin, an ultra microscopic body, a reflex or a trophic nerve influence or something yet to be discovered, I fail to see why the operation of evisceration will not as effectually remove it as an enucleation. Selenkowsky in studying the lymph currents found a stain injected into one vitreous of a rabbit reached the other in two days. If the infecting element has already passed beyond the reach of carbolic cauterization inside of the sclera, it in all probability cannot be captured by going one millimeter deeper and removing the sclera. This also seems to me to hold good regardless of the method of transmission, whether it be along the substance of the optic nerve by continguity of tissue, by the lymph channels, the

venous or arterial circulation, or the ciliary nerves. Statistics are useless in weighing the relative values of the two methods as sympathetic ophthalmia has followed both operations. Furthermore, it follows so rarely when compared with the number of these operations that the ratio is attenuated to a point, which makes figures useless. The committee appointed by the Ophthalmological Society of the United Kingdom to decide which operation afforded greatest immunity from sympathetic ophthalmia, presented a report which left the question still open. Pflueger, at the 13th international congress (1900) claimed evisceration was equal to enucleation in preventing sympathetic ophthalmia, when it is performed within three weeks of the injury. De Schweinitz agrees with him fixing the same time limit. These three weeks of grace of course refer to the stereotyped and arbitrary period in which we are supposed to be safe from sympathetic trouble. An evisceration leaves all of the orbital tissues undisturbed and presents a clean, white, well cauterized and well drained open wound for resolution. An enucleation presents the cut ends of six muscles, the open ends of numerous arteries, veins, nerves and lymphatics, and the more or less oozing surface of Tenon's capsule. It is difficult for me to believe that the latter condition offers any greater protection than the former against the development or transmission of this unknown enemy. Gifford says "Evisceration is, in my opinion, the operation of choice as a prophylactic for sympathetic ophthalmia, although the weight of authority is in favor of enucleation." This is the only outspoken declaration in favor of evisceration as a prophylactic which I find in the literature of the subject. If the object of removing the ball instead of its contents is to get in front of an advancing enemy, why not carry the logic to its conclusion and exenterate the orbit. There is no proof that evisceration is the less prophylactic and I wonder if the antagonism to it is only an instance of transmitted medical dogma.

The fourth question is, which operation is safer as regards infection of the orbital tissues, sinus thrombosis and meningitis? It seems to me the answer to this question can be formulated from general surgical principles regardless of statistics or individual experience. The description above of the cauterized sclera left by an evisceration and the open sources of infection following an enucleation are to me conclusive. Evisceration was introduced in 1884 by Alfred Von Graefe as a substitute for

enucleation in panophthalmitis. Noyes in 1872 and Williams in 1877 had already performed this operation. Von Graefe claimed the danger of meningitis was thereby diminished. The report of the committee of the Ophthalmological Society of the United Kingdom made in 1896 was not conclusive on this subject. Out of 10.734 simple enucleations they found seven cases of fatal meningitis. In these seven cases panophthalmitis had existed. One case of fatal meningitis was found after evisceration. However, the general attitude of the profession is in accord with De Schweinitz, who says, "Surgeons differ in regard to the advisability of enucleating the globe during the acute stages of panophthalmitis, some operators declining to perform excision under such circumstances, in the belief that meningitis is liable to follow, while others do not recognize such a danger, and do not hesitate to operate. Under these circumstances evisceration has been recommended, and wisely, in the opinion of the author, because the channels leading to the brain membranes are not opened and micrococci are less liable to enter." If inclined to ignore the fundamental surgical principle of this last sentence let us remember that in panophthalmitis an enucleation is a difficult operation and an evisceration almost as simple as opening an abscess. This difference in the rapidity and simplicity of the operations, should be considered in those cases in which the length of the anæsthesia and the amount of the anæsthetic administered are factors.

In conclusion I would say:

First. Evisceration is a simpler operation under what we may call normal conditions. It is decidedly easier in the presence of panophthalmitis or a collapsed globe.

Second. It leaves a more normal mucous membrane, a fuller orbit, for a time at least and probably for life. The fuller orbit helps to diminish the depth of the upper sulcus when a prothesis is worn and also probably adds to the excursions of the artificial eye.

Third. There is no evidence to prove that it is not as safe a prophylaxis against sympathetic ophthalmia as enucleation.

Fourth. It affords greater security against orbital infection, sinus thrombosis and meningitis.

Fifth. Protection against the recurrence of malignant neoplasms requires a thorough removal of all contiguous tissue. The amount of tissue to be removed depends upon the nature,

size and location of the growth. These surgical principles obtain when such developments appear in or on the eye. They usually demand enucleation of the ball and sometimes exenteration of the entire orbit.

SYMPATHETIC OPHTHALMIA.

Edward Stieren (*The Penn. Med. Jour.*, Oct., 1907) classes diseased or injured eyes that are most liable to cause sympathetic ophthalmia under five heads. (1) Those which have suffered wounds in the ciliary region; (2) extensive anterior synechiæ following corneal ulcer; (3) eyes containing a foreign body; (4) plastic uveitis ending in osseous degeneration, and (5) uveitis ending in phthisis bulbi, or atrophy of the globe.

Concerning injuries to the ciliary body he gives Mauthner's classification, as accidental and operative. Under the first class are those injuries caused by penetration of foreign bodies into the ciliary body, with lodgment therein; punctured or incised wounds of the ciliary body, without lodgment of a foreign body; contused or lacerated wounds of the ciliary body, inflicted by blunt agents; incised, punctured and lacerated wounds of the periphery of the cornea, with or without injury of the ciliary body, whereby the periphery of the iris alone, or along with it a portion of the ciliary body, becomes incarcerated in the wound; and finally, contusions of the ciliary body from mechanical violence applied to the eyeball without opening it, as blows with the naked fist, tennis balls, spanners, etc., and causing cyclitis and iridocyclitis.

Operative injuries include incarceration of the iris after simple extraction, iridodesis, direct injury of the ciliary body when the incision has been made too far out in the sclerotic, and, occasionally, iridectomy. Stieren would apply the term "sympathetic irritation" only to instances of irritation of the anterior part of the eyeball (the ciliary corneal nerves) by foreign bodies lodging on the cornea or upper lid, corneal ulcers, phyctenular keratitis, burns, etc., causing photophobia, lacrimation and conjunctival, or possibly slight ciliary, injection of the sound eye.

BACTERIOLOGY AND TREATMENT OF SERPIGINOUS ULCERS OF THE CORNEA.*

By M. Gallemaerts, M.D.

Translated by Adolf Alt, M.D.

Like the diseases of other organs, those of the eyes have received great benefit from the discoveries of bacteriology. As well as the affections of the conjunctiva those of the cornea have not escaped the researches of bacteriologists and among the inflammations of the cornea there is one which has been the cause for a series of important researches, I mean, the serpiginous ulcer.

With this name we designate an affection characterized by the formation on the surface of the cornea of an ulcer, at first limited, which, however, quickly spreads in width and depth and destroys the whole of the corneal tissue. It is complicated by hypopyon and perforation of the cornea, and terminates by the formation of a large leucoma or the production of panophthalmitis.

Against such a grave affection which ends in the total loss of vision a great many forms of treatment have been in use and the choice between them is difficult when the clinical examination alone is considered.

Fortunately bacteriology has come to our aid. While we thought ourselves in the presence of a clinical type always due to the same cause, a series of micro-organisms have been found of unequal resistance and of different virulence, but capable of producing identical affections of the cornea. The treatment has naturally taken advantage of this discovery to the great benefit of the patients.

We shall report in the following on the results of our own researches in 39 patients treated in our department at the Hôpital St. Jean during one year. In none of these cases did we have to deal with those lymphatic, phlyctænular ulcers so frequent in children; all of the patients suffered from a grave lesion with a tendency to spread rapidly and deeply, with or without hypopyon and were looked upon as sepiginous ulcers.

Mode of examination. We make a bacteriologic examination before any treatment is applied. Certain precautions are neces-

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sary when searching for microbes in corneal affections. First, the eye should be cocainized. When anæsthesia is complete a loop of platinum is drawn over the surface of the ulcer; frequently the ulcer must be scraped with a small spoon. These manipulations are easily accomplished without a lidholder or fixation forceps. The scrapings are spread out on a slide and stained, or may serve for cultures.

The microbes we have found are the *staphylococcus pyogenes aureus, the Morax-Axenfeld diplobacillus, the pneumococcus and the streptococcus.*

Staphylococcus. The staphylococcus which so easily produces suppuration is found but rarely in ulcers of the cornea. Thus we have found it once only and this corneal ulcer was the result of a conjunctivitis with an abundant secretion which contained only the staphylococcus pyogenes aureus. (Case history follows here.)

Diplobacillus of Morax-Axenfeld. The diplo-bacillus discovered by Morax and Axenfeld in 1896 shows such precise morphological characteristics that its study offers no difficulty.

It is on an average 2 to 3 *m.* long and 1 to 1.5 *m.* broad; certain forms are smaller. Its extremities are somewhat rounded off. There are always two joint together with a little space between them. They are Gram negative.

With ordinary stains no capsule is visible. (In the translator's cases a capsule was nearly always visible.) In the temperature of the room no culture can be obtained. It must be made in the oven and succeeds well only on blood serum or serum-agar, and on material which contains fluids of human origin. On serum-agar the colonies show as little transparent, grayish, round droplets with a smooth edge.

The culturing media must be alkaline.

The diplobacillus grows easily on the conjunctiva and causes a special conjunctivitis, which has been found in all countries, since Morax and Axenfeld have first described it; it is extremely frequent in Belgium.

In the last few years only have the corneal complications due to the diplobacillus aroused attention. We mention the works of Paul, Erdmann, Zur Nedden, Agricola, Axenfeld, Stoewer, and others, all of whom have found that the diplobacillus can give rise to grave ulcers which in certain cases assume the form of serpiginous ulcers.

The corneal diplobacillus ulcer is not very rare in our practice; we have been astonished at the frequency with which it presents

itself. Thus we have observed 20 grave cases in the space of one year. (Case histories follow here.)

In a certain number of cases the keratitis is only a small limited marginal ulcer, in others it has a great tendency to spread; aside from the principal focus there are other smaller ones; the ulcer is irregular and shows ramifications which announce a new extension; not rarely there is a hypopyon and iritis, and its development may be accompanied by severe pains and there may be chemosis.

The origin of the affection cannot always be easily determined; the beginning is often spontaneous.

A trauma cannot be proven in all cases; we have found one in 4 cases only. We have encountered the diplobacillus ulcer in individuals who had previously not suffered with their eyes and who did not show a trace of conjunctivitis. In other cases there was a diplobacillus conjunctivitis which complicated an old trachoma.

The treatment with zinc sulfate which gives such excellent results in diplobacillus conjunctivitis yields the same surprising results in the keratitis. Axenfeld advises to wash the conjunctiva and cornea ten to twelve times a day with a ½% solution of zinc sulfate for one-half or one minute. The patient must look downwards in order to bathe the cornea in the solution which fills the conjunctival fornix. Furthermore, five times during the day hot compresses with a 3% solution are to be applied for 20 minutes, and finally during the night the lids and conjunctiva are greased with a pommade containing zinc oxide and ichthyol.

We have found that it is not necessary to recur to such frequent treatments. Three times during the day we wash the conjunctiva abundantly with a 1% sulfate of zinc solution and once a day we cauterize the ulcer with a cotton pledget soaked in a 1:40 solution of zinc sulfate; and we apply a bandage until the epithelium is reformed. Under this treatment the grave symptoms disappear rapidly; the pain ceases; the hypopyon grows smaller and soon is completely absorbed; after 24 or 36 hours the clinical appearance of the lesion is altogether changed.

In none of the cases did we have to make a paracentesis or to employ the galvano-cauter; and, yet, some of these ulcers were so grave that formerly we should not have hesitated to employ one of these remedies at the risk of producing a great leucoma. Thanks to the zinc sulfate we obtain smaller scars and capable

of clearing up better than those which follow a large cauterization with the thermocauter.

Thus far we cannot explain this special action of the zinc sulfate. When brought in contact with cultures of the diplobacillus the sulfate of zinc does not kill them, it does not even arrest their development until after several days. As Zur Nedden has demonstrated the normal secretion of the conjunctiva has no bactericidal quality, in a pathological condition it is different. The bactericidal qualities increase with the intensity of the inflammation. The sulfate of zinc probably enhances this quality in a peculiar way, and since the diplobacillus lives on the surface only, as Stock's microscopical researches show, it is rapidly destroyed.

Pneumococcus. The discovery of the pneumococcus in corneal ulcers is already 15 years old.

Gasparini in 1893, and Axenfeld and Uhthoff almost at the same time, recognized the pneumococcus in keratitis with hypopyon, which had been described as serpiginous ulcer of the cornea. All publications following the work of these authors have confirmed their observations, so that, as Axenfeld said, the serpiginous ulcer is, with few exceptions, the result of a pneumococcus infection, and a beginning, not yet typical, infiltration which contains the pneumococcus, when growing usually assumes the aspect of a serpiginous ulcer.

The pneumococcus of the cornea as well as that of the conjunctiva is the Fraenkel-Weichselbaum diplococcus, 0.8 μ. long and 0.3 to 0.4 μ. broad, Gram positive, encapsuled, lanceolate, two joined together. On serum-agar or blood serum the culture grows only above 22°. The medium must be slightly alkaline. The virulence of the pneumococcus coming from the eye is less than when coming from other organs.

Contrary to the diplobacillus the pneumoccoccus penetrates deeply into the corneal lamellæ; it is therefore not found in the superficial layers; it is found among the leucocytes in the whitish ring which surrounds the ulcer.

In the time of one year we have treated fourteen pneumococcus ulcers. (Here follow the case histories, eight of which were treated with Roemer's serum).

In 10 cases out of 14 a traumatism was the origin of the affection. In 4 cases we could not find the cause. The pneumococcus has not the power to attack the corneal tissue when protected by its epithelium. Even when the pneumococcus is in great

abundance on the conjunctiva, a break in the continuity of the epithelium is necessary in order to allow the pneumococcus to penetrate between the lamellæ of the cornea and to work its evil. All but two cases were complicated with hypopyon, in two cases only was there a dacryocystitis.

The bacteriological diagnosis given, what is the treatment? We have not followed a uniform method in all of these cases. To the old treatments with chemical cautery, galvano-cautery, keratotomy after Saemisch we have added the more recent serotherapy. To Roemer we owe the patient researches which have led to the introduction of the serotherapy in the treatment of serpiginous ulcer.

Roemer's serum is a polyvalent bactericide which is injected in the dose of 10 cubic centimetres once or several times. According to Roemer's experience the immunisation hinders or arrests the development of the pneumococcus in the cornea.

The serum has been used with a varying success; praised by some, it is considered inactive by others. We desired to try the serum without any preconceived opinion. Therefore we treated a series of cases by scraping the ulcer and the cauterization with iodine dissolved in the essence of juniper (5%), a fluid which possesses a greater power of penetration than the tincture; other ulcers were cauterized with the galvano-cauter; in other cases we had recourse to the Saemisch operation and the emptying of the anterior chamber.

When a dacryocystitis was present we made the extirpation of the lacrimal sac. In certain cases we have obtained a cure by these different methods without Roemer's serum. In 8 other cases we have employed Roemer's serum and here we have been able to see that when the old methods gave no result and did not stop the progress of the ulcer, one injection of 10 cubic centimetres of the serum changed the picture rapidly, stopped the pain, brought about the disappearance of the hypopyon and the arrest of the destructive process. We have, therefore, no doubt concerning the efficacy of Roemer's serum and the necessity of its use in certain cases. We even are able to state from their clinical aspect which are the cases which need the serum and which do not. The latter show less reaction; the grayish white ring surrounding the ulcer is barely visible, the infiltration instead of being spread widely is more limited. The former ones are surrounded by a white zone with small disseminated foci and a high hypopyon.

Thus, in accord with other observers, we have concluded from our clinical observations that there are several varieties of pneumococcus as regards their virulence and that the ulcers which they produce differ in their clinical aspect, in their course and the effect of the treatment. At the last meeting of the Heidelberg Ophthalmological Society Roemer could confirm these clinical facts from experiments he had made. He has been able to put this virulence in numbers and to show that it varies in the enormous proportions of from 1:40 to 1:150,000; consequently in certain cases this virulence is three thousand times greater than in others. Therefore, it is not astonishing that so considerable a difference should manifest itself by a different clinical aspect in a tissue as sensitive as is that of the cornea.

These facts furnished by Roemer should prove a new incentive to employ the serum.

It is plain that when certain serpiginous ulcers heal with ordinary means, we have to deal with a pneumococcus of an attenuated virulence; but other ulcers will demand the use of the serum; in other cases the virulence may be so great that the serum even cannot stay the process of the ulcer. Keeping these points in mind and examining the clinical aspect closely we can quickly determine the appropriate treatment and thus cure pneumococcus ulcers or at least avoid a large destruction of the cornea, preserve in almost all cases some degree of vision, and above everything never be forced to the mournful necessity of exenterating the eye on account of panophthalmitis or enucleate it on account of total staphyloma.

Microbic associations. The infections are not always due to one microbe only. Thus we have encountered a case in which the pneumococcus was associated with the streptococcus and two cases in which it was accompanied by the diplobacillus.

The association of the pneumococcus with the diplobacillus has been reported by Zur Nedden and Erdmann.

The association of the pneumococcus with the streptococcus produces disastrous results as we saw in our case. (Follows case history). The two cases in which pneumococcus and diplobacillus were associated ended very favorably with the preservation of the eyes. (Follow case histories).

Finally in a further case we found the diplobacillus associated with undetermined bacilli (case history).

CONCLUSIONS.

What conclusions can we draw from all these facts?

The bacteriological analysis of all corneal ulcers becomes a duty and must be made before any treatment is instituted. In similar clinical forms different species are found; among these the diplobacillus and the pneumococcus are by far the most frequent; a bacteriological examination alone permits us to determine the microbic agent which produces the ulcer and thus gives us the means of a successful treatment.

The treatment of the diplobacillus ulcer differs greatly from that of the pneumococcus ulcer. The former heals under the application of zinc sulfate. The latter needs a more complicated therapy. In both cases the patient will gain greatly by this precision in diagnosis and treatment, and may be saved an eye.

Finally, we think the term serpiginous ulcer can no longer be reserved alone for the pneumococcus ulcer, since different microbes, and especially the diplobacillus, can cause it. This term should always be completed by the designation of the microbic species which causes the keratitis.

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MEDICAL SOCIETIES.

ST. LOUIS MEDICAL SOCIETY.

OPHTHALMIC SECTION.

Meeting of October 9, 1907.

The Vice-Chairman, Dr. J. M. Ball, Presiding.

Eyeball Containing Bone.—Dr.. A. Alt.

I have brought with me part of an eye which I removed a few weeks ago on account of sympathetic irritation. I had seen the patient fifteen years previously when he was a child of four years of age; he had then a large leucoma of the right cornea following blennorrhœa neonatorum in which a little space was clear enough to warrant the making of an iridectomy, which I did. I had not seen the patient again until two or three weeks ago, when he came to me complaining that for two years he had had severe pain in this eye, with symptoms of sympathetic irritation in the fellow. When I examined the eye I felt distinctly that it contained bone and advised its removal, to which he consented. The sympathetic irritation disappeared at once. An interesting fact was that the wound bled for nine days, first quite freely and then oozing until it gradually stopped nine days later. I inquired whether he bled unusually freely when he cut himself, and was told he did; so he evidently is a hæmophilic. I want to call your attention to the large anterior chamber; calcareous cataract and large bony shell at the posterior pole of the shrunken eyeball.

Forcepts for Fixing the Everted Eye-Lid.—Dr. A. E. Ewing.

In many of the operations for entropion by the subsection method that I have seen performed by Drs. J. Green and M. H. Post, as well as in those of my own experience, I have frequently observed the knife slip a little to one side or the other in the division of the tarsus because of the lack of a firm support to the lid. This would result in an incision with irregular margins. In a search among various forceps and clamps that have been proposed for fixing the eye-lid I found that only the one devised by Ratti could be used for working upon the lids when

everted and at the same time give sufficient exposure of the under surface of the lid for an extensive wound near the margin.

This instrumnt serves very well but does not control hæmorrhage efficiently. The several instruments here exhibited, descriptions of which may be found in the *American Journal of Ophthalmology,* (February, 1903, and March of 1905), represent my efforts to devise a forceps which should control hæmorrhage. The present one is an improvement upon that described in 1905, as it bears a plate against which the lid may rest while the incision is being made. In its application the plate is placed against the skin and the thinner blade is passed back of the tarsus on the conjunctival surface. With it either the upper or the lower lid may be held firmly in an everted position while performing the incision and the hæmorrhage is very well under control.

As to the operation itself, considerable experience with it has convinced me that it is rendered much more efficient and permanent by suturing the conjunctival edge of the standing or orbital portion of the tarsus into the bottom of the wound made by the tarsal incision, the sutures passing through the lid at the base of the cilia and being tied either upon the skin or on the conjunctival surface in the wound as may be preferred. By this means the margin of the lid and the cilia are everted and are compelled to heal in the position desired. This procedure was described and illustrated in the *American Journal of Ophthalmology,* February, 1903. Up to the beginning of the present year I have employed this method upon forty-six different lids, thirty-one upper and fifteen lower. I have been able to keep track of thirty-seven of them and know positively that the results have been good. Three of the earlier ones upon the upper lids were partial failures. Two of these I repeated with entire success; the other has caused so little annoyance that I am still keeping it under observation, as the few irregular cilia are gradually coming into line with those that are practically normal. In one of the lower lids there was also a partial failure because of the incision having been made too near the lid margin. This has been rectified by a repetition of the operation. Eleven of these upper lids and three of the lower had previously been operated upon by other methods from one to three times.

I have seen Dr. Green use only small interrupted sutures for closing the narrow skin wound which he formerly made near the

base of the ciliar. In the text books there is illustrated a suture credited to him, which, in the upper lid is passed through the margin of the lid into the skin wound, then is re-entered beneath the skin in the same direction and brought out upon the skin well above the wound. I do not remember whether this suture was doubly armed and I do not know how it was tied.

For the last twenty years in all of these operations that I have seen him perform Dr. Green has not removed the narrow strip of skin and has depended upon contractible collodion for causing the eversion, usually painting enough upon the skin opposite the wound immediately after the incision to maintain the eversion sufficiently to cause the wound to gap but not to interfere with the circulation, and the following day adding more until the gaping was wide and the eversion was excessive. This splint, if we may so call it, was repeated as was necessary and continued for two or three weeks until the healing was well established. His idea was to do as little injury to the tissues of the lid as was possible consistent with successful results. For the upper lid the results were usually satisfactory, but so poor in the case of the lower lid that in place of his operation he always resorted to some of the skin methods. Personally I have had better success upon the lower lid with his operation than I have seen with any other method, but it frequently failed. These failures have been an incentive to me to devise this modification.

DISCUSSION.

Dr. John Green, Jr., stated that through the courtesy of Dr. Ewing he had been instructed in the technique of this operation several years ago. One of the principal advantages of this modification consists in the permanency of results. As to that he thought there could be no question. On one occasion he operated on a patient that had been previously unsuccessfully operated by the Green method. He did Dr. Ewing's operation on all four lids. The operation was done three years ago, and the result is as perfect to-day as it was at first.

If it became necessary to repeat the operation it can be done without impairing the integrity of the lid structures. That should count for a good deal in the selection of any operation. The quill suture which Dr. Ewing has described insures a more complete eversion of the anterior flap and at the same time prevents cutting of the skin surface by the fine sutures that pass through the lid. Dr. Green had been perfectly satisfied with the operation and expected to do it to the exclusion of all others.

Dr. M. Wiener stated that he had performed the operation a number of times and believed as far as the lower lid was concerned it gave most excellent results. For the upper lid, however, he was inclined to adhere to Hotz's method.

Dr. Ewing stated that the pressure exerted by the clamp was not painful and yet was sufficient to control hæmorrhage.

Staining of the lower lid from injecting Argyrol into the Lacrimal Sac.—Dr. F. L. Henderson.

The patient complained of epiphora, which had lasted a year. Stenosis of the duct and catarrh of the sac were found. Treatment consisted in washing out the sac daily, with 10 per cent argyrol solution. This was done by inserting a syringe into the upper canaliculus and allowing fluid to escape through the lower. On one occasion the sac wall gave way and the solution passed into the sub-cutaneous tissue. Great swelling and discoloration followed. Potassium iodide internally in increasing doses was ordered. In one week the swelling had disappeared and the discoloration was reduced to a slate colored strip in the lower lid. The stenosis and epiphora responded quickly to treatment. A slight but perceptible discoloration persists. Potassium iodide internally and externally in the form of an ointment have been tried. Mercury bichlorid ointment was rubbed in faithfully with no result. Potassium iodide by cataphoresis was unsuccessfully employed. Patient refused to allow any hypodermic injections into the discolored tissue. The questions involved are: (1) What is the composition of the stain? (2) Is there any agent which will bleach or cause the stain to be absorbed? (3) How are we to get the bleacher or absorbent into contact with the stain, by the stomach, hypodermically, by inunction, or by electricity?

DISCUSSION.

Dr. M. H. Post thought that in case of such an accident it would be well to use a hypodermic injection at once, in order to get the solution of iodide of potassium in contact with the argyrol at once. In his case, there being no lining membrane to the chalazion cavity into which the argyrol had been injected, iodide potassium was injected directly into the tissue.

Dr. Alt stated that he had been so unfortunate as to have had a case similar to that of Dr. Henderson. He made an injection of argyrol with a small syringe of the eye dropper type with a fine gold tip, which did not allow of much force. He had frequently made such injections without trouble, but this time it went where

he did not want it. Having heard of Dr. Post's case a little while before he at once ordered the patient to take potassium iodide, 10 grains three times a day. That day there was no discoloration to be seen, but the next day the patient came to the office and said, "Doctor, you have given me a nice black eye. Just look at me." She did have a pretty bad looking eye. He increased the dose of potassium iodide and each day the discoloration was less, and after five or six days no discoloration was seen. Probably the rapid bleaching was due to the prompt treatment with potassium iodide. He did not wait for any discoloration to show itself. He was sure it would soon begin.

Dr. J. C. Buckwalter stated that he had an experience similar to Dr. Henderson's, but that the discoloration rapidly cleared up and disappeared entirely in about four months.

Dr. H. Muetze stated that about two years ago he treated a patient for double dacryocystitis a number of times by sounding and injections of 10 per cent. argyrol solution. One day this same accident happened, as related by Dr. Henderson. Within a few minutes the right lower lid had assumed a dark blue discoloration and in about ten minutes both lids were so badly swollen that the patient could hardly open the eye. He advised cold applications and gave iodide of sodium internally and within three months the discoloration, which later had changed to a light brown, had disappeared.

Dr. John Green, Jr., stated that on one occasion a weak solution of silver nitrate intended for the sac found its way into the cellular tissue of the lid. A pressure bandage worn for several days reduced the swelling. The staining was never very intense and soon cleared entirely.

Dr. Henderson, in conclusion, said he had come for consolation, and had gotten considerable of that, but not much help. The precipitate that is formed in the solution of iodide of potassium and argyrol is a slate colored precipitate, small in quantity. On shaking the solution the whole becomes dark again. He feared that in rubbing into the lid an ointment of iodide of potassium he had not accomplished anything, owing to the dark residue which the union with argyrol leaves. He would like to find something that will dissolve the slate-colored precipitate. A chemist who is working on this thinks it is oxide of silver. Yesterday he said he had found a perfect solvent for it.. He poured his solution into the preciptate and in a very short time it all dissolved. The solvent was prussic acid, which of course precludes its use.

*A Case of Uniocular Diphtheritis Conjunctivitis.**—Dr. W. H. Luedde.

J. W., male 13 months old, first seen June 29, 1908. The patient had some fever and a sore mouth showing white patches supposed to be thrush. Inspection revealed a membrane attached to the palpebral conjunctiva of the upper and lower lids completely covering, but not attached to, the globe. This membrane was easily removed. The membrane rapidly reformed on the conjunctiva of the lids and persisted for a long time, not having entirely disappeared when the parents removed the child from the hospital about five weeks after the beginning of the trouble. 15,000 units of diphtheria antitoxin were given in all. Bacteriological examination demonstrated the presence of the Klebs Loeffler bacillus first on the conjunctiva of the left eye, later in the mouth and nose. Right eye was never involved. The white patches in the mouth showed no signs of thrush on microscopic examination. There was present, however, a short rod-shaped bacillus that could not be identified but in some respects resembled the Klebs Loeffler bacillus. Later examination proved the presence of the Klebs Loeffler bacillus in the mouth.

DISCUSSION.

Dr. Higbee stated that at the St. John's Hospital clinic he had observed a case of a child seven years old who manifested diphtheritic conjunctivitis in the left eye. To casual observation the case appeared to be one of purulent ophthalmia, but on closer inspection he found a membrane attached to the palpebral portion of the conjunctiva. In the center, just in front of the cornea, the membrane had not entirely closed and through this opening one could see the freely movable eye-ball.

The child had a temperature of 102° F. She was given 4,000 units of antitoxin the first day, and as there was very little improvement on the second day she was given 3,000 units more. Laryngeal diphtheria manifested itself in her sister about this time. The father objected to our using any more antitoxin as he thought we were affiliated with the druggist for the purpose of fleecing him.

The child was taken to the O'Fallon Dispensary, where treatment was continued. It was learned later that the child made an uneventful recovery. Cultures verified the diagnosis.

*See this Journal Nov., 1907, page 321.

ABSTRACTS FROM MEDICAL LITERATURE.

By W. A. Shoemaker, M.D.,

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RUPTURE OF THE PECTINATE LIGAMENT.

Leslie Buchanan (*The Ophthalmoscope,* Nov., 1907) adds two more cases of this injury to the five cases reported by him in March, 1903. The lesion is produced, as a rule, by a blow with some blunt object which makes a dent in the eyeball. As the pectinate ligament is the true tendon of the ciliary muscle a rupture of this ligament allows the ciliary muscle to retract from the corneal margin either outwards or backwards and outwards, which means a displacement of the ciliary body. If the rupture has been extensive the ciliary body may fall back in the vitreous. Buchanan has seen the extent of the rupture vary from one-sixth to nearly one-half of the corneal circumference. There may not be a rupture of the sclera coincident. The lens is usually dislocated and may be found in the vitreous chamber lying on the ciliary body below. This can only be seen some time after the injury, after the media has cleared. as there is severe hemorrhage into the anterior chamber. After this has been absorbed it will be found that the anterior chamber is deeper in some parts than in others, and that the pupil is not circular. If there has been only a small tear the pupil is displaced to one side and will have somewhat the appearance of a coloboma, but can be differentiated from that condition by the uneven depth of the anterior chamber. In more extensive ruptures the iris may be torn loose from the ciliary body or may remain attached and be carried back with it to its new position. Since the pectinate ligament forms the posterior wall of the canal of Schlemm this injury opens that canal into the anterior chamber and ultimately causes the obliteration of the canal. This naturally produces a state of glaucoma. The high tension is likely to last a good while and generally causes considerable pain. This with the dislocation of the lens and the atrophy of the ciliary body which usually follows makes the prognosis very bad. As this condition very materially affects the prognosis it is important to recognize it as early as possible.

REMOVAL OF THE LENS IN HIGH MYOPIA.

W. E. Lambert (*Trans. A. Oph. Soc.*, Vol. XI., Part II.) reports having romoved the lenses of both eyes of two patients with high myopia.

The first case was a girl 16 years of age with a myopia of 21 D. in the right eye and 18 D. in the left. Vision with this correction was 20/70 in each eye. He did Fukala's operation (needling with linear extraction) washing out the soft lens matter by irrigating with normal saline solution. A discission of the capsule was done in the right eye twelve days after and in the left eye seventeen days after the needling. With a weak plus lens the patient had 20/30+ vision in each eye which later improved to 20/20.

The second patient was a young woman 31 years of age who had always been near-sighted. She had extensive changes in the fundus of the right eye and considerable thinning of the choroid in the left. She was kept under observation for some time and just before operation her vision was 20/200 in the right with —22 D. and 20/100+ in the left with —20 D. The same operation was done on this patient and after a discission of the capsules her vision with weak lenses was 20/30+ in each eye and with +3 or S. added she read Jaeger No. 1.

Lambert believes the dangers of the operation have been exaggerated and that even extensive changes in the fundus may not be a contra-indication for the operation. He recommends the operation of needling with linear extraction rather than repeated needling and allowing the lens matter to be absorbed.